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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/559,757	04/27/2000	Yoshio Ozawa	04329.2306	2923

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EXAMINER

PHAM, THANH V

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 06/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/559,757

Applicant(s)

OZAWA ET AL.

Examiner

Thanh V Pham

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 April 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election of the first species, claims 8-15, in Paper No. 24 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Drawings

2. Figures 10's, 11's, 12's, 15's, 16's, 17 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. Figure 12B is objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "105" has been used to designate both a *resist pattern* and a *width reduced pattern*. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

5. The disclosure is objected to because of the following informalities: on page 21, line 12, " $10^{13}\text{c}^{-2}\text{m}$ " should be $-10^{13}\text{cm}^{-2}-$ and line 24, "10C" should be $-10\text{B}-$.

Appropriate correction is required.

6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 8-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicants' admitted prior art in combination with **Hisamune US Patent No 6,414,352 B1** and **Takeuchi US Patent No 5,907,183**.

Re claims 8, 10 and 12, 14, in the description of the prior art of fig.5, the applicants disclose that an insulating film containing silicon and nitrogen 2 is formed on

the substrate 1; a film which must be processed and which contains silicon 3 is formed on the insulating film; those films are processed such that a portion of the insulating film is exposed to the outside; the structure obtained in the previous steps is subjected to an oxidation process.

The applicants' admitted prior art does not provide, in the oxidation step, oxidizing gas containing one of ozone and oxygen radicals.

The Hisamune reference discloses oxidation processes are required after forming the gates and recognizes that the oxygen radical created within a furnace, while proceeding the conventional oxidation step, would diverge through the separating regions and the known "gate bird's beak" exists (col. 2, line 55 – col. 3, line 29).

To employ the oxidation process with conventional oxidizing gas containing one of ozone and oxygen radicals of Hisamune to the oxidation process of applicants' admitted prior art would have been obvious to one of ordinary skill in the art as the oxidizing gas containing one of ozone and oxygen radicals as recognized as conventional by Hisamune would be selected in accordance with the oxidation step as taught by applicants' admitted prior art.

Re claims 9 and 13, the Takeuchi reference discloses ten conventional examples for Si-N bonds at the interface between the second gate insulating film and the floating gate electrode (col. 4, line 8 – col. 5, line 29) wherein example (8) teaches that silicon oxide film is formed and is annealed in a nitrogen-containing gas then a silicon nitride film is formed on the silicon oxinitride film (col. 5, lines 11-18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply further the steps of Takeuchi into the above combination of Hisamune with applicants' admitted prior art process. The use of silicon oxide film containing nitrogen and a silicon nitride film as the insulating film is well known to those skilled in the art as taught by Takeuchi.

Re claims 11 and 15, the critical concentration of $5 \times 10^{13} \text{ cm}^{-2}$ of nitrogen in the interface of silicon oxinitride film with the silicon substrate would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular concentration to overcome applicants' admitted prior art's constraint (specification's page 21), and it appears that the process would possess utility using this concentration.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh V Pham whose telephone number is 703-308-2543. The examiner can normally be reached on M-T (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7382 for After Final communications.


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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

TvP
June 17, 2003



George Fourson
Primary Examiner